MATERIAL SAFETY DATA SHEET

EMERGENCY TELEPHONE: 800-424-9300 (Chemtrec)

Health : 3
Flammability : 1
Reactivity : 1

Lonza Inc.
17-17 Route 208 Fair Lawn, NJ 07410 800-777-1875 (9am - 5pm) 309-697-7200 (After 5pm)

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MATERIAL
Dantobrom S

CAS NO. Mixture

FORMULA Mixture

CHEMICAL NAME Mixture

DATE ISSUED
09/10/03 - Revision

SUPERCEDES
06/27/02

DOT HAZARD CLASSIFICATION
5.1, PG II

DOT SHIPPING NAME
Oxidizing Solid, N.O.S.

DOT LABEL Oxidizer

IMO SHIPPING NAME
Oxidizing Solid, Corrosive, N.O.S. MARINE POLLUTANT

********** I - INGREDIENTS **********

	APPROXIMATE WEIGHT %	TWA/TLV
1-Bromo-3-chloro-5,5-dimethylhydantoin (CAS No. 16079-88-2)	60	0.2 mg/m^3 (Lonza Internal Standard)
1,3-Dichloro-5,5-dimethylhydantoin (CAS No. 118-52-5)	28	0.2 mg/m^3 (OSHA PEL) 0.4 mg/m^3 (OSHA STEL) 0.2 mg/m^3 (ACGIH TLV)
1,3-Dichloro-5-ethyl-5-methylhydantoin (CAS No. 89415-87-2)	11	0.2 mg/m^3 (Lonza Internal Standard)
Sodium chloride (CAS No. 7647-14-5)	1	None established

********** II - PHYSICAL AND CHEMICAL PROPERTIES **********

APPEARANCE Off-white briquette
VISCOSITY Not applicable
BOILING POINT Not applicable
VAPOR DENSITY (Air=1) Not applicable
PERCENT VOLATILE (by volume) <0.5
EVAPORATION RATE (Butyl Acetate=1) <1

pH 3.6 (10 g/l @ 25°C)
ODOR Very slight pungent
MELTING OR FREEZING POINT 120-148°C
VAPOR PRESSURE (mm Hg) Not applicable
SOLUBILITY IN WATER 5 g/l @ 25°C
SPECIFIC GRAVITY (WATER = 1) Not known

********** III - FIRE AND EXPLOSION INFORMATION **********

FLASH POINT 287°F (COC)
AUTO IGNITION TEMPERATURE Not known
LOWER EXPLOSION LIMIT (%) Not applicable
UPPER EXPLOSION LIMIT (%) Not applicable

EXTINGUISHING MEDIA
FOAM X
DRY CHEMICAL X
ALCOHOL FOAM
WATER X
CO_2
OTHER

SPECIAL FIRE FIGHTING PROCEDURES:
To minimize the progressive generation of noxious gases, flood burning material with large quantities of water. Must wear NIOSH/MSHA approved self-contained breathing apparatus and protective clothing. Cool fire-exposed containers with water spray.

********** III - FIRE AND EXPLOSION INFORMATION (continued) **********

UNUSUAL FIRE AND EXPLOSION HAZARDS:
Material is a strong oxidizer. May ignite combustible materials and may produce noxious gases. Products of combustion are toxic.
This product is classified as an ST-1 dust explosive hazard (ASTM E-1226-88). Airborne dusts of this product in an enclosed space and in the presence of an ignition source may constitute an explosion hazard. Use adequate explosion-proof ventilation systems to control dust at the source. Avoid generating product dust near sources of ignition, including static electricity. Use safety measures in accordance with the 1988 edition of NFPA 654 (Standard for the Prevention of Dust Explosions in the Chemical, Dye, Pharmaceutical and Plastic Industries).

********** IV - HEALTH EFFECTS INFORMATION **********

ROUTES OF ENTRY - SKIN CONTACT X **EYE CONTACT** X
INHALATION X **INGESTION**

EFFECTS OF OVEREXPOSURE
Based upon the available toxicity information for this, and for closely related materials, it is anticipated that this material will be harmful if swallowed, and direct skin and eye contact can result in severe skin and eye irritation and/or chemical burns with potential irreversible tissue damage. Inhalation of dust or aerosol can be severely irritating to the lung with potential systemic absorption and tissue damage. Repeated skin exposure may induce sensitization.

OVEREXPOSURE MAY AGGRAVATE EXISTING CONDITIONS:
No effects indicated.

EMERGENCY AND FIRST AID PROCEDURES:
Eyes: Flush eyes with large amounts of running water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Get immediate medical attention. If physician not available, flush for additional 15 minutes and then transport victim to medical care.

Skin: Immediately wipe away excess material with a dry cloth while removing contaminated clothing and shoes. Under safety shower, wash affected areas thoroughly with large amounts of water, and soap if available, for at least 15 minutes. Get immediate medical attention. Discard or decontaminate clothing and shoes.

Ingestion: If swallowed, immediately give 3-4 glasses of water. DO NOT induce vomiting. If vomiting occurs, give fluids again. Get immediate medical attention. Have physician determine if patient's condition allows induction of vomiting or evacuation of stomach. Do not give anything by mouth to an unconscious or convulsing person.

Inhalation: Remove from area to fresh air. If not breathing, clear airway and start artificial respiration. If victim is having trouble breathing, give supplemental oxygen, if available. Get immediate medical attention.

********** IV - HEALTH EFFECTS INFORMATION (continued) **********

CHEMICALS LISTED AS CARCINOGEN BY:

NATIONAL TOXICOLOGY PROGRAM - No
I.A.R.C. MONOGRAPHS - No
OSHA - No

********** V - REACTIVITY INFORMATION **********

STABILITY: **STABLE** X — **CONDITIONS TO AVOID**
UNSTABLE — None known (Decomposes at 165°C)

HAZARDOUS DECOMPOSITION PRODUCTS
Thermal decomposition may produce toxic vapors/fumes of chlorine, bromine, organic materials and oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION — **CONDITIONS TO AVOID**
MAY OCCUR — **WILL NOT OCCUR** X — None known

INCOMPATIBILITY (MATERIALS TO AVOID)
WATER — **OTHER** X — Strong acids and alkalis, high storage temperatures, moisture and readily oxidizable material.

********** VI - SPILL AND DISPOSAL INFORMATION **********

STEPS TO BE TAKEN IN CASE OF MATERIAL SPILL OR RELEASE
DANGER! Oxidizing and Corrosive material. Possible dust explosion hazard. Do not get in eyes or on skin. Repeated or prolonged contact can result in sensitization and/or irreversible tissue damage. Do not breathe dust. For spills, wear appropriate protective equipment, and respiratory protection. Where dust may be generated, wear full face respiratory protection, and remove all sources of ignition. For large spills, or when spilled material comes in contact with water, self-contained breathing apparatus is preferred.

Carefully sweep up spilled material (avoid generating dust) and place in an appropriate container for disposal. Do not contaminate with oxidizable materials. Neutralize any residue with dilute, alkaline sodium bisulfite or thiosulfate solution; absorb with sand or vermiculite and place in a compatible container for disposal. If spilled material is wet, neutralize and proceed as stated above.

Material is toxic to fish. Do not discharge into lakes, streams, ponds or public water unless in accordance with an NPDES permit.

********** VI - SPILL AND DISPOSAL INFORMATION (continued)**********

WASTE DISPOSAL METHODS

Dispose of in compliance with all Federal, state and local laws and regulations. Incineration is the preferred method. Relatively small quantities of product may be neutralized as stated above, and, if in accordance with local laws and the operators of the local sewage treatment plant, the neutralized material may be discharged into the sewer system.

********** VII - PERSONAL PROTECTION INFORMATION **********

ENGINEERING CONTROLS

In processes where dusts or airborne particulates may be generated, proper ventilation must be provided in accordance with good ventilation practices.

RESPIRATORY PROTECTION

In processes where dusts or airborne particulates may be generated, a NIOSH/MSHA jointly approved respirator is advised.

PROTECTIVE GLOVES

Rubber or neoprene, to prevent skin contact.

EYE PROTECTION

Wear chemical goggles where there is a potential for eye contact. Use safety glasses with side shields where there is no potential for contact.

OTHER PROTECTIVE EQUIPMENT

Eye wash; safety shower; protective clothing (long sleeves, coveralls or other, as appropriate), to prevent skin contact.

********** VIII - STORAGE AND HANDLING **********

PRECAUTIONS FOR STORAGE AND HANDLING:

Do not breathe dust. Avoid generating dust. Store in a cool, dry place, isolated from all organic material. Product is a strong oxidizer and is corrosive. Avoid heat and direct sunlight. Do not allow product to come in contact with oxidizable material. Keep container closed. Please also see "Unusual Fire and Explosion Hazards" in Section III of this MSDS for information on the dust explosivity of this material.

********** IX - TOXICOLOGY & ECOTOXICOLOGY INFORMATION **********

The toxicity and ecotoxicity information provided is for this material and component(s) of this material(s).

TOXICITY

ACUTE

For Dantobrom S:

- oral LD_{50} (rat): 468 - 477 mg/kg
- eye irritation (rabbit): Severe irritant and corrosive
- skin irritation (rabbit - Draize test): Corrosive to both abraded and unabraded skin
- skin corrosivity (rabbit - US DOT test): Not corrosive

********** IX - TOXICOLOGY & ECOTOXICOLOGY INFORMATION (continued)**********

ACUTE (continued)

For Bromochloro-5,5-dimethylhydantoin:
- dermal LD_{50} (rabbit): >2000 mg/kg
- skin sensitization (guinea pig - Buehler Test): Skin sensitizer.

For 1,3-Dichloro-5,5-dimethylhydantoin:
- skin sensitization (guinea pig - Buehler Test): Skin sensitizer.

ECOTOXICITY

AQUATIC

For Dantobrom S:
- LC_{50} (rainbow trout - 96 hours): 0.5 mg/l
- LC_{50} (bluegill sunfish - 96 hours): 1.2 mg/l
- LC_{50} (Daphnia magna - 48 hours): 0.4 mg/l
- LC_{50} (mysid shrimp - 96 hours): 0.93 mg/l
- LC_{50} (sheepshead minnow - 96 hours): 1.4 mg/l (as Br_2)
- EC_{50} (eastern oysters - 96 hours): 0.84 mg/l (as Br_2)

For 1,3-Dichloro-5-ethyl-5-methylhydantoin:
- EC_{50} (Algae - Selenastrum sp. - 72 hours): 0.12 mg/l

********** X - MISCELLANEOUS AND REGULATORY INFORMATION **********

CANADIAN WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS) CLASSIFICATION

Class C

DOMESTIC SUBSTANCE LIST (DSL) STATUS

The components of this material are currently listed on the Canadian DSL.

TRANSPORT OF DANGEROUS GOODS (TDG)

Oxidizing Solid N.O.S.
Class 5.1, 9.2
UN 1479 PGII

FEDERAL LEVEL REGULATIONS:

TOXIC SUBSTANCES CONTROL ACT (TSCA INVENTORY) STATUS:

The components in this product are currently listed on U.S. EPA TSCA 8(b) inventory.

TSCA Section 12(b) Export Notification:

Components present in this product which, if exported, could require either annual or one-time reporting under this regulation are as follows:

Chemical Name	CAS Number	Typical Maximum Concentration
Exempt - FIFRA Registered Product		

EPA REGULATION ON PESTICIDES, FIFRA:

This product is an EPA FIFRA registered pesticide (EPA Registration No. 6836-116). This product may only be used in the EPA registered application(s) stated on the product label.

********** X - MISCELLANEOUS AND REGULATORY INFORMATION (continued) ********

CERCLA (Comprehensive Environmental Response, Compensation and Liability Act of 1980 requires notification of the National Response Center (Telephone 800-424-8802) in the event of a release of quantities of the following hazardous materials contained in this product, if the release is equal to or greater than the Reportable Quantities (RQs) listed in 40 CFR 302.4:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		

SARA Title III, Sections 302/304 (Superfund Amendments and Reauthorization act of 1986) - This act requires emergency planning, including agency notification, for possible release of the following components of this material, based upon the Threshold Planning Quantities (TPQs) and release Reportable Quantities (RQs) listed for the Components in 40 CFR 355:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		

SARA Title III Sections 311/312 - This act requires reporting under the Community Right-to-Know provisions due to the inclusion of the following components of this material in one or more of the five hazard categories listed in 40 CFR 370:

Chemical Name	CAS Number	Hazard *) Categories
1-Bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	A, F
1,3-Dichloro-5,5-dimethylhydantoin	118-52-5	A, F
1,3-Dichloro-5-ethyl-5-methylhydantoin	89415-87-2	A, F

*) The five hazard categories are as follows: F=FIRE HAZARD; S= SUDDEN RELEASE OF PRESSURE; R=REACTIVE; A=IMMEDIATE (ACUTE) HEALTH HAZARD; C=DELAYED (CHRONIC) HEALTH HAZARD

SARA Title III Section 313 - This act requires submission of annual reports off the releases of the following components of this material if the threshold reporting quantities as listed in 40 CFR 372, are met or exceeded:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		

STATE RIGHT-TO-KNOW REGULATIONS:

CALIFORNIA PROPOSITION 65 - Components present in this material which the State of California has found to cause cancer, birth defects or other reproductive harm are as follows:

AS A CANCER HAZARD

Chemical Name	CAS Number	Typical Maximum Concentration
Bromoform	75-25-2	12 ppm

********** X - MISCELLANEOUS AND REGULATORY INFORMATION (continued) ********

STATE RIGHT-TO-KNOW REGULATIONS (continued):

MASSACHUSETTS Right-to-Know - The following components of this material are included in the Massachusetts Substance List and are present at or above reportable levels:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		

MICHIGAN Critical Materials - The following components of this material are included in the Michigan Critical Materials List:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		

NEW JERSEY Right-to-Know - The following components of this material are included in the New Jersey Hazardous Substance List and are present at or above reportable levels:

Chemical Name	CAS Number	Typical Maximum Concentration
1-Bromo-3-chloro-5,5-dimethylhydantoin	16079-88-2	60%
1,3-Dichloro-5,5-dimethylhydantoin	118-52-5	28%
1,3-Dichloro-5-ethyl-5-methylhydantoin	89415-87-2	11%

PENNSYLVANIA Right-to-Know - The following components of this material are included in the Pennsylvania Hazardous Substance List and are present at or above reportable levels:

Chemical Name	CAS Number	Typical Maximum Concentration
None known		